

IN THE CLAIMS

Please amend the following claims to read as follows:

1. (Once Amended) Apparatus for processing data for controlling a pressure to be applied to contact areas of a wafer and a polishing pad during a step in chemical mechanical polishing operations, the apparatus comprising:

a first processor programmed to provide pressure data representing the pressure to be applied to the contact areas during a polishing step; and

a second processor programmed to process data representing relative movement between the wafer and the pad in overlapped contacting positions for providing area data representing a value of the contact areas between the wafer and the pad in the overlapped positions;

the second processor being further programmed to process the area data and the pressure data for providing force data representing the force to be applied to the contact areas during the polishing step of the sequence.

6. (Once Amended) Apparatus for controlling a first pressure to be applied to first contact areas of a wafer and a polishing pad in chemical mechanical polishing operations, the pressure being applied according to force data specifying the value of forces to be applied to first contact areas, the apparatus comprising:

a drive system configured to cause relative movement between the wafer and the pad into overlapped positions;

a central processor for processing data to specify the chemical mechanical polishing operations, the data including a command to the drive system to cause the relative movement, the data further representing the pressure to be applied to the first contact areas of the wafer and the polishing pad;

a feedback circuit for providing output signals representing increments of the relative movement; and

a force control processor separate from the central processor, the force control processor being responsive to both the pressure data and the output signals representing actual values of the relative movement, the force control processor successively processing a contact area program and a force program to provide force data representing the force to be applied to one of the first contact areas of the wafer and the pad.

7. (Once Amended) Apparatus as recited in claim 6, wherein the force control processor provides the force data in two stages, a first stage being in response to one of the output signals to provide area data representing a value of the contact areas, a second of the stages being in response to the pressure data and to the area data to provide the force data.

9. (Once Amended) Apparatus as recited in claim 6, wherein a retainer ring is provided for orienting the wafer, wherein the apparatus further controls a

second pressure to be applied to second contact areas of the ring and the pad, wherein the relative movement causes relative movement of the ring and the pad, and wherein:

the central processor further processes second pressure data representing a value of the second pressure; and

the force control processor is further responsive to the second pressure data and to the output signals representing the relative movement of the wafer and the pad, the force control processor further successively processes the contact area program and the force program to provide second force data representing the force to be applied to the second contact areas of the ring and the pad.

10. (Once Amended) Apparatus as recited in claim 6, wherein a pad conditioning puck is provided for conditioning the pad, wherein the apparatus further controls a second pressure to be applied to second contact areas of the puck and the pad, wherein the relative movement causes relative movement of the puck and the pad, and wherein:

the central processor further processes second pressure data representing a value of the second pressure; and

the force control processor is further responsive to the second pressure data and to the output signals representing the relative movement of the wafer and the pad, the force control processor further successively processes the contact area program and the force program to provide second force data representing the force to be applied to the second contact areas of the puck and the pad.

11. (Once Amended) Apparatus for maintaining a constant pressure to be applied to respective contact areas of a wafer and of a polishing pad in chemical mechanical polishing operations, the apparatus comprising:

a drive for causing relative movement between the wafer and the pad into a plurality of different overlapped positions;

a force application system for urging the wafer and the pad against each other so that in each of the different overlapped positions the respective contact areas are in contact and have different values, the system being capable of providing different forces for the urging;

a feedback circuit for providing first and second output signals representing respective first and second increments of the relative movement, the first and second increments being at spaced first and second times;

a central processor programmed for computing first position data in response to the first output signal, the first position data representing the actual relative movement at the first time, the central processor being further programmed for computing second position data in response to the second output signal, the second position data representing the actual relative movement at the second time, the central processor being further programmed for computing pressure data representing the constant pressure to be maintained; and

a force control processor separate from the central processor, the force control processor being programmed for converting the first position data to first area data representing the value of a first of the contact areas at the first time, the

force control processor being further programmed to process the first area data and the pressure data to output first force data representing a first force to be applied to the first contact area at the first time;

the force application system being responsive to the first force data for urging the wafer and the pad against each other with the first force to provide the constant pressure on the first contact area at the first time;

the force control processor being further programmed for converting the second position data to second area data representing the value of a second of the contact areas at the second time, the force control processor being further programmed to process the second area data and the pressure data to output second force data representing a second force to be applied to the second contact area at the second time;

the force application system being responsive to the second force data for urging the wafer and the pad against each other with the second force to provide the constant pressure on the second contact area at the second time.

12. (Once Amended) A method of controlling a pressure to be applied to contact areas of a wafer and of a polishing pad in chemical mechanical polishing operations, the method comprising the operations of:

providing a first processor to input pressure data representing the pressure to be applied to the contact areas during a polishing step;

providing a dedicated processor other than the first processor to only process three types of data, one type of data being data representing relative

movement between the wafer and the pad in overlapped contacting positions, the pressure data being the second type of data;

by use of the dedicated processor, computing area data representing a value of the contact area between the wafer and the pad in the overlapped positions, the area data being the third type of data; and

by use of the dedicated processor, processing the area data and the pressure data to compute force data representing the force to be applied to the contact areas during the polishing step of the sequence.

Please add the following claims:

15. (New) A method according to claim 14, wherein:

the characterizing operation is performed with respect to at least two of the characteristics of the steps; and

the determining operation is performed for each of the at least two characteristics.

16. (New) A method according to claim 14, wherein:

the characterizing operation is performed with respect to at least three of the characteristics of the steps; and

the determining operation is performed for each of the at least three characteristics.